National Institute of Environmental Health Sciences

Constructing climate change scenarios of urban heat island intensity and air quality

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Abstract:

As the global population becomes increasingly urbanised, so interest has grown in the potential climate change impacts on city infrastructure, services, and environmental quality. However, urban areas are only beginning to be represented explicitly in the land-surface schemes of dynamical climate models through modified energy and moisture budgets. This paper summarises recent evidence of urban impacts on climate and vice versa. The technique of statistical downscaling is then introduced through exemplar studies of London's future urban heat island and peak ozone concentrations. Projections of both indices are derived from atmospheric variables supplied by four general circulation models, driven by a medium-high (A2) emissions scenario for the 2050s. The results show further intensification of the nocturnal heat island and higher ozone concentrations that are most pronounced in summer. These changes reflect sensitivity to variations in regional climate alone, so omit other factors such as changes in land use, emissions. climate feedbacks, or synergies between air quality and heat islands. Nonetheless, the downscaled scenarios are consistent with an emerging picture of increasing risks to human health in urban areas unless appropriate adaptation measures are taken.

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Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES)

Special Report on Emissions Scenarios (SRES) Scenario: SRES A2

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Ecosystem Changes, Temperature

Air Pollution: Ozone

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

Urban

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Europe

European Region/Country: European Country

Other European Country : England

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Computing System, Exposure Change Prediction, Methodology

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Medium-Term (10-50 years)

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content